SPRT®

SP-POS58Ⅳ
Line Thermal Printer

User's Manual

Beijing Spirit Technology Development Co, Ltd.

Content

Introduction

POS58Ⅳprinter is a new type line thermal printer ,it features in fast speed printing, low printing noise, high reliability, perfect printing quality and ribbon needless avoiding the vexation of regular maintenance.

POS58Ⅳ printer: small in outline dimension, simple operation, and extensive application, especially suitable for commercial cash register, PC-POS, bank POS and all kinds of receipts printing.

Chapter 1 Characteristic Specification

1.1Printing Specification

●Printing method: direct thermal

●Printing paper width:57.5±0.5mm

●Printing density:8dots/mm,384dots/line

●Printing speed:approx.60mm／sec.

●Reliability:

Printing head life:100km

Using condition:

＊Print 12 × 24 ASCII characters, print 50 lines each time, intermittent print repeatedly

＊Each dot-line printing at the same time should not exceed 25%, each character-line and one dot vertically printing repeatedly should not exceed11 times

＊Use specified thermal paper

●Valid printing width:48mm

1.2 Printing Paper

●Thermal paper model:TF50KS－E（Japan paper co. ltd）

AF50KS-E(JUJO THERMAL)

•Thermal paper: Width－－－－－－－ 57.5±0.5mm

Outer Diameter －－－80mm（max.）

Inner Diameter －－－ 13mm（min.）

Thickness－－－－－ 53～60g／m^2

1.3 Printing Font

•IBM Character set II (ANK):

12×24dots，1.25（W）×3.00（H）mm;

•GB2312-80(Chinese):

24×24dots，3.00（W）×3.00（H）mm.

1.4 Interface

•Serial interface (POS58S):

DB25 socket (orifice), supports RTS/CTS protocol,

Baud rate: 1200~115200bps. Adjustable.

Data structure: one start bit +seven or eight data bits +one or over one stop bit (s),

no parity.

•Parallel interface(POS58P):

DB25 sockets (needle), 80bit parallel interface, supports BUSY/ACK

handshaking protocol ,TTL signal level.

•Ethernet Interface:

It is a way to connect to Ethernet for ordinary printer. Can work on full duplex or half-duplex mode.

Ethernet 802.3 protocol, upper layer protocols have TCP、UDP、ICMP、IP、ARP、HTTP.

•Cash drawer control

DC12V，1A，60pinRJ-11socket.

1.5 Printing Control Command

•Character printing command: supports double width and double height print of ANK characters, user-defined characters and Chinese characters, the character line spacing is adjustable.

•Graphics printing command: supports the print of bit map graphics and download bit map graphics with different density

•GS barcode printing command: supports EAN-13，EAN-8 barcode printing.

1.6Power Supply

●   DC12V±10％，2A，A-1009-3P   Power socket

1.7 Operation Environment

Operation temperature:5～40℃   Relative humidity:10～80％

Storage temperature:-20～60℃   Relative humidity:10～90%

1.8   Outline Dimension

● 138（W）×200×(L)×120(H) mm

Chapter 2 Installation and Operation

2.1Printer Appearance

Such as figure 2－1，figure 2－2

Figure 2－1　Printer appearance（Planform）

Figure 2－2 Printer appearance（back view）

2.2Paper Installation

POS58Ⅳadopts57.5±0.5mm width thermal paper.

The steps of thermal paper installation are as the following:

1.When there is no paper in the print head, please don't press【FEED】button ,avoiding to influence the printing head life; as figure2-3，hold down【PUSH】，so open the paper case and change paper.

Figure 2－3 Paper Installation

2. Please don't draw the paper forwards or backwards with hands .

2.3 Interface Connection

2.3.1 Serial Interface Connection

The serial interface of SP-POS58Ⅳ printer is compatible with RS232C standard, supports RTS/CTS handshaking protocol, it uses DB25 socket (orifice),the pin order of the serial port is as Fig.2-4 shows:
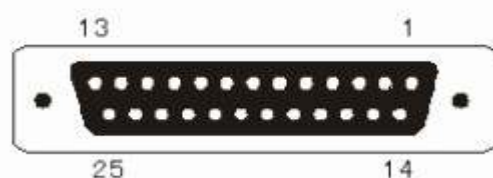
Fig.2-4Pin Order of the Serial Port

The pin assignment of serial interface is shown in Fig.2-1:

Pin No.	Signal	Source	Description
2 RXD		Host	Printer receives data from host
3 TXD		Printer	Printer transmits control code X-ON/X-OFF and data to host
5	CTS	Printer	Signal "MARK" indicates that the printer is "BUSY" and unable to receive data; "SPACE" indicates that the printer is "READY" for receiving data.
6	DSR	Printer	Signal "space" indicates that the printer is" online"
7 GND			Signal Ground
8 DCD		Printer	The same as CTS

Fig.2-1Pin Assignment of Serial Interface

Note:

① "Source" denotes the source that signal comes from;

② Logical signal level is EIA .

The baud rate and data structure in serial interface mode are set to 9600bps,8 data bits ,no parity bit and1or over1stopbit(s).

The serial interface of POS58Ⅳ can be connected to standard RS-232C interface. When connected to IBM PC or compatible machine, connection can according to Fig2-5.
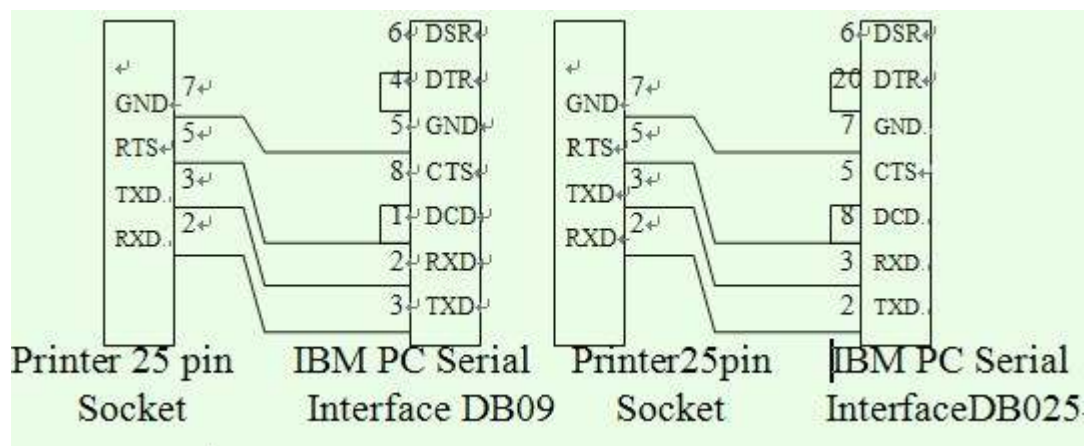
Fig.2-5Connection between POS58S and IBM PC Serial Interface Sketch Map

2.3.2 Parallel Interface Connection

The parallel interface of SP-POS58P printer is compatible with CENTRONICS, supports BUSY and /ACK handshaking protocol, it uses DB25socket (needle), the pin order of parallel port is as Fig.2-6 shows:
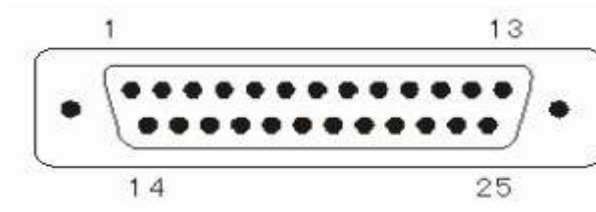
Fig.2-6Pin Order of the Parallel Port

The pin assignment of parallel interface is shown in Fig.2-2show

Note:

①"In" denotes inputting to the printer，"Out" denotes outputting from the printer
②Signal level is TTL standard

2.3.4 Cash Drawer Interface

The cash drawer interface of POS58Ⅳ adopts RJ-1160 pin socket ,as Fig2-7 shows:

Pin No.	Signal	Direction	Description
1	/STB	In	Strobe pulse to latch data, reading occurs at falling edge.
2	DATA1	In	These signals represent the 1st
3	DATA2	In	bit to 8th bit of the parallel
4	DATA3	In	interface data, each signal is at
5	DATA4	In	HIGHT level when data is
6	DATA5	In	logic1,and is LOW when data is
7	DATA6	In	logic 0.
8	DATA7	In	
9	DATA8	In	
10	/ACK	Out	Answer pulse, LOW level signal indicates that data have already been received and the printer gets ready to receive the next data

| 11	Busy	Out	HIGH level signal indicates that the printer is BUSY and cannot receive data.
12	PE	Out	HIGH level signal indicates that paper is end.
13	SEL	Out	Pulling up to HIGH level signal by a resistor Indicates the printer is online
15	/ERR	Out	Pulling up to HIGH level signal by a resistor Indicates there is no error
14.16.17	NC	---	No connection
18-25	GND	---	Grounding logical 0 level

Fig.2-2 The pin assignment of parallel interface
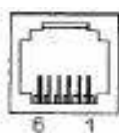
Figure 2－7 Cash Drawer Interface

The pin assignment of the cash drawer interface is as follows：

Pin No.	Signal	Direction
1	Cash is Ground	---
2	Cash drawer driver signal	Out
3	Cash drawer on/off status signal	In
4	+12VDC	Out
5	N.C	---
6	Cash drawer on/off status signal ground	---

Figure 2-8 The pin assignment of the cash drawer interface

2.3.5 Power Connection

POS58Ⅳ uses external power supply as12V DC±10％,3.5A, power socket is A-1009-3P model, as Fig.2-8 shows:

Fig.2-9 Power Socket

2.4 Buttons and Indicators

Power switch

Control the status of power 　　　　　 is power off，to push "一" is switch on.

The feeding button

Hold down FEED, start paper feeding, release the button paper feeding stops
(If install buzzer, it will ring when feeding paper, stop ring when feeding stops)

Opening button

Hold down the opening button，the upper cover will open.
Power indicator (red) show the power switch status.

Status indicator(green)   The assignment as follows：

Indicator status	Introduction
bright	Online
turn off	Offline
Scintillation 1 times out	Lack paper
Scintillation 2 times out	Printer head over temperature

Figure 2－10

2.5 Self-test

The self-test can check the condition of printer, if the printer prints out the self-test receipt correctly, It means the printer works normally. Otherwise it needs to repair .

The self-test will print out the firm ware version, interface setting and 128ANK characters.

Holding down【FEED】button and turn on the power, then release the button, self-test begins automatically.

Chapter 3 Printing Control Commands

3.1 Summary

POS58Ⅳ offers ESC/POS printing command sets

Each command is described in following format :

Printing Command   Function

Format: ASCII：   the standard ASCII character sequence

Decimal：   the decimal numbers sequence

Hex：   the Hex number sequence

Explanation: what the command does and how to use it.

Example: some examples are listed to illustrate the command

for better understanding.

3.2 Command Specifications

3.2.1 Printing Command

LF				Print and Feed Line
Format:	ASCII:	LF		
	Decimal:	10		
	Hex:	0A		

Explanation:

Print the content in the buffer and feed paper one line. Only feed paper Forwards one line if the buffer is empty

ESC	J			Print and Feed n Line
Format:	ASCII:	ESC	J	n
	Decimal:	27	74	n
	Hex:	1B	4A	n

Explanation：

Print the content in the buffer and feed paper n dot lines.(n/203 inch), n=0~255.

This command is only valid for current line and will not change the space

Example:

A A A_____

BBB _____ n / 2 0 3inch （n dot lines ）
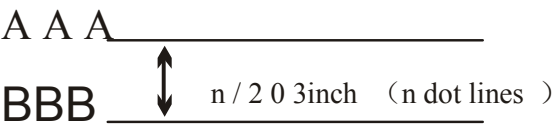
3.2.2 Line Space Setting Commands

ESC	2		Set Line Spacing to 1/6 Inch
Format：	ASCII:	ESC	2
	Decimal:	27	50
	Hex:	1B	32

Explanation:：

Set line spacing to1/6 inch.

ESC	3				Set Line Spacing to n Dot Lines(n/203inch)
Format：ASCII：		ESC	3	n	
Decimal：		27	51	n	
Hex:		1B	33	n	

Explanation：

n=0～255。Set line spacing to n dot lines .n=0~255

One dot line is 1/203 inch for POS58Ⅳ, this command sets the dot-line spacing to n/203inch.Default n=10.

Example:

A A A
BBB   n＝30,30 dot spacing （30/203inch ）
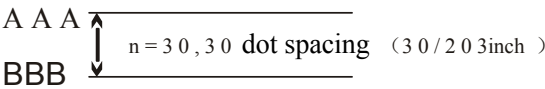
3.2.3 Character Printing Commands

ESC	!			Set Character Print Mode
Format: ASCII:		ESC	!	n
Decimal：		27	33	n
Hex：		1B	21	n

Explanation：

ESC ！ n is a comprehensive command to set character print mode, is used for selecting print character size . Each bit of print parameter n is defined :

× × D5 D4 ×   × × ×

1: Double Height Print

1: Double Width Print
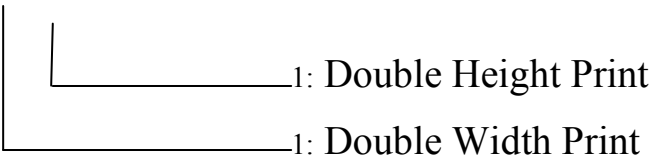
Default n=0,that means no character enlargement

ESC SO			Set Double Width Character Printing
Format：ASCII:	ESC	SO	
Decimal：	27		14
Hex：	1		0E

Explanation:

All characters following this command on the same line are printed in double width, this command can be canceled by a carriage return or DC4 command.

ESC DC4			Cancel Double Width Character Print
Format:	ASCII:	ESC	DC4
	Decimal:	27	20
	Hex	1B	14

Explanation:

After carrying out this command, the characters will be printed in normal width.

ESC %			Select/Cancel User-defined Characters
Format:	ASCII:	ESC	%	n
	Decimal:	27	37	n
	Hex:	1B	25	n

Explanation:

When n=1, select user-defined character set; When n=0, select internal character set.

Default n=0.

ESC &			Define User-defined Characters
Format:	ASCII	ESC &	s	n	m	[a [p]s×a]m-n+1
	Decimal:	27 38	s	n	m	[a [p]s×a]m-n+1
	Hex:	1B 26	s	n	m	[a [p]s×a]m-n+1

Explanation:

ESC & is used to define user-defined characters。 s=3， $32 \leq n \leq m \leq 127$, $0 \leq a \leq 12, 0 \leq p \leq 255$,

◆s is the number of bytes inverted direction ,s=3here。

◆n is the starting ASCII code of user-defined character。

◆m is the stopping ASCII code of user-defined character。

When define only one character, n=m, the maximum number of user-defined characters is 96。

◆a is the number of dots in horizontal direction。

◆p is the data of self-defined characters, there are s×a bytes for each character, the total number of user-defined characters is m-n+1。

◆User-defined characters are valid until re-defined, reset or power off, format of the user-defined characters is shown as follows:
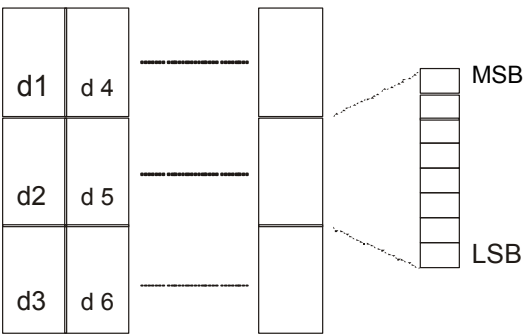
3.2.4 Special Control Commands

ESC c 5			Enable/Disable Switch Button Function	
Format:	ASCII: ESC	c	5	n
	Decimal: 27	99	53	n
	Hex: 1B	63	35	n

Explanation:

When n=1,button 【LF】 is enabled;
When n=0,button 【FEED】 is disabled; Default n=0

3.2.5 Graphics Printing Commands

ESC *						Set Bit-map Graphics
Format: ASCII: ESC	*	m	n1	n2	[d]k	
Decimal: 27	42	m	n1	n2	[d]k	
Hex: 1B	2A	m	n1	n2	[d]k	

Explanation:

Select bit-map command, m is for setting bit-map mode; n1, n2 are for setting number of dots; [d]k is for setting contents of bit-map.

m=0,1,32,33，n1=0～ 255。n2=0～1。d=0～255。

k=n1+256×n2 (m=0，1)

k=(n1+256×n2)×3 (m=32,33)

◆The number of horizontal dots of the graphics is n1+256×n2

◆If the number of dots is more than one line, the extra portion will be Ignored (referring the following table)

◆d is the bit map data,for1of bit means the related dot will be printed
And for 0 of bit means the related dot will not be printed.(k is the total number of dot

◆m is the selected bit map mode

M	Mode	Vertical		Horizontal	
		Dot	Density	Density	Max.Dots
0	8-dot single density	8	68DPI	101DPI	192
1	80dot double density	8	68DPI	203DPI	384
32	24-dots single density	24	203DPI	101DPI	192
33	24-dots double density	24	203DPI	203DPI	384

◆ n is used to select bit-map graphics mode

dots map data (bitmap)   dots map data (bitmap)
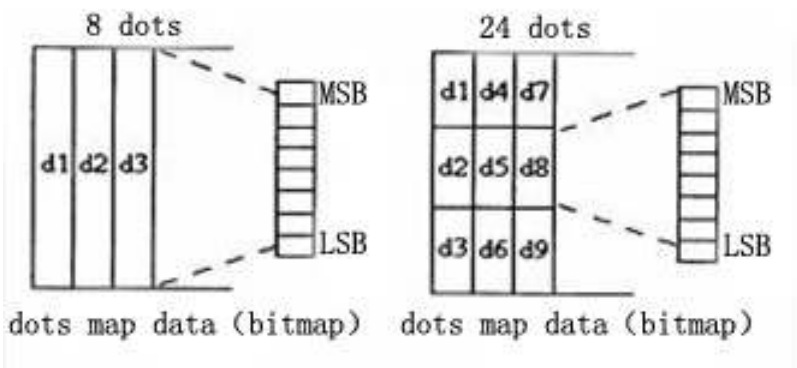
GS   /   print download bit-map graphics

Format：	ASCII：	GS	/	n
	Decimal：	29	47	n
	Hex：	1D	2F	n

Explanation：

This command is used to print download bit-map graphics .n=0～3

To define downloading bit-map graphics using
GS* command:

N	Bit-map mode	Vertical density	Horizontal density
0	Normal	203DPI	203DPI
1	Double width	203DPI	101DPI
2	Double height	101DPI	203DPI
3	Double height And double width	101DPI	101DPI

GS	*			Define download bit-map graphics		
Format： ASCII：	GS	*	n1	n2	[d]k	
Decimal：	29	42	n1	n2	[d]k	
Hex：	1D	2A	n1	n2	[d]k	

Explanation：

This command is used to define download bit-map graphics.

n1=1～48，n2=1～255，n1×n2<1200,k=n1×n2×8。

◆d is the bit-map data。

◆The horizontal size of this graphics is n1×8 dots, and vertical size is n2×8dots。

◆The definition is valid until re-define, power off or system reset。Format of the download bit-map data is shown as follows：
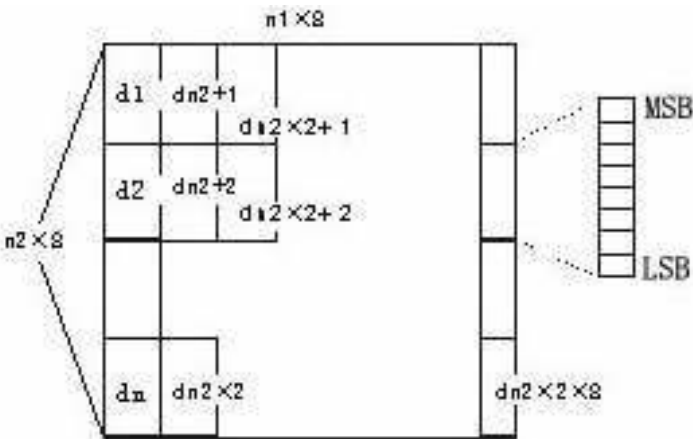
3.2.6 Barcode Print

GS	W			Set barcode width	
Format： ASCII：	GS	W	n1	n2	
Decimal：	29	87	n1	n2	
Hex：	1D	57	n1	n2	

Explanation：

n1:barcode narrow bar width, unit: dot . Each dot for POS58Ⅳ printer is 1/203 inch or 0.125mm. Default n1=3.

n2:barcode broad bar width

GS　　k　　　　　　　　　　　　　　　　　Printing barcode

Format: ASCII: GS k n ［d］ NUL

　　　　Decimal: 29 107 n ［d］ 0

　　　　　Hex: 1D 6B n ［d］ 00

n---Select the printing barcode system ：

n	Barcode
2	EAN-13
3	EAN-8

Pay attention to the specified character number of each barcode.EAN-13 and EAN-8 can generate parity characters automatically

［d］－－－is the printing barcode data.

NUL－－－NUL denotes GS K command is over，and carry out barcode print.

GS　　H　　　　　　　　　Select/cancel printing HRI characters

Format： ASCII： GS H n

　　　　Decimal： 29 72 n

　　　　　Hex： 1D 48 n

Explanation：

n=0，don't print HRI characters .Default n=0

n=1，print HRI characters under barcode

GS　　h　　　　　　Set barcode height

Format： ASCII： GS h n

　　　　Decimal： 29 104 n

　　　　　Hex： 1D 68 n

Explanation：

Set the height of printing barcode.

n=0～255,its unit is dot. When n=0,it is 256dots。

Each dot for POS58Ⅳ printeris1/203inch or 0.125mm.

Default n=60

GS w　　　　　　　　　　　　Set barcode width

Format： ASCII： GS w n

　　　　　Hex： 1D 77 n

Explanation:

Set the width of printing barcode。

n＝1～4. When n is different, the width of bar code will be different, as shows in the following tab

n	Narrow size	Broad size
1	1	3
2	2	5
3	3	7
4	4	9

Its unit is dot. Each dot forPOS58 Ⅳis1/203 inch or 0.125mm.

Default n=3

3.2.7 Other Commands

ESC @		Initialize printer	
Format：	ASCII：	ESC	@
	Decimal：	27	64
	Hex：	1B	40

Explanation：

ESC@ command is to initialize the following contents of the printer:

·Clear the data in the printing buffer;

·Restore the default of each printing command

·Select character printing mode;

·Delete user-defined characters.

ESC p		Cash Drawer	Control		
Format：	ASCII：	ESC	p	m	n l	n2
	Decimal：	27	112	m	n 1	n2
	Hex：	1B	70	m	n1	n2

Explanation：

This command is to generate a pulse to trigger the opening and closing of the cash drawer,n1,n2 define the duration of the trigger pulse

m=0 or 30H,0＜nl≤n2≤255。

Opening time is nl×2ms,closing time is n2×2ms

ESC   v   Transmit Status of Printer

Format：ASCII：   ESC   v

Decimal：   27   118

Hex：   1B   76

Explanation：

Send printer status to the host

When printer received the command, it transfers one byte through TXD

serial interface. Definition of said byte is shown as below:

Bit	Function	0	1
0	Printer head temperature	Normal	Printer head over temperature
1	Not in use	0	0
2	Paper tester	With paper	Without paper
3	Undefined	———	————
4	Not in use	0	0
5	Not in use	0	0
6	Undefined	———	———
7	Undefined	———	———

ESC   u   Transmit Status of Equipment

Format：ASCII： ESC   u   n

Decimal：   27   117   n

Hex：   1B   75   n

Explanation：

Send the peripheral equipment status to the host:

Default n=0

When printer received this command, it transmits one byte through TXD
Line of the serial interface to the host.

The definition of any bit in this byte is as follows:

Bit	Function	0	1
0	Cash drawer on/off signal level	LOW	High
1	Undefined	————	————
2	Undefined	————	————
3	Undefined	————	————
4	Not in use	0	0
5	Undefined	————	————
6	Undefined	———	———
7	Undefined	———	———

ESC   #   n   Setting serial command

Format: ASCII：   ESC   #   n
             Decimal：   27   35   n
             Hex: 1B   23   n

[Description]：The command set serial n show serial baud and data format as follows：

Bit	Function	0	1
1	Baud	000~111 respectively are 1200，2400，4800，9600，19200，38400，57600，115200	
2			
3			
4	SSL		XON/XOFF
5	Character interval	7 bit	8 bit
6	Checking	Have Even parity check	Without
7	Checking ways select	Neglect	Odd
8	Data reception the bug handle		Print"？"

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The default is；9600，without check，8 bit data，RTS/CTS SSL
The method of this command setup leads for passing printer connecting orifice sending into the command to setup baud rate. Note :when the set is over ,if have not power ,the baud still be the baud before setting, the set baud will be effective until renew give power. The printer will be always use this baud till renew setting , need not repeat set when give power each time..

DLE EOT n				Real time status transmission
[Format] ASCII：	DLE	EOT	n	
Decimal：	10	04	n	
Hex：	16	4	n	

[Description]   Sending the printer state that designated by parameter n just in time：
            n=1： Sending state of the printer
            n=2： Sending off line state
            n=3： Sending error state
            n=4： Sending state of paper sensor

·When printer receives the command ,returns to the interrelated status immediately

·Avoiding to put this command in the command sequence of more than2 characters.

·This command will be also valid even though the printer is set to forbid by the command of ESC=(selecting peripheral)

·When sending printer current state ,each state is indicated by 1byte

·Transmission state value of the printer can not confirm whether the master computer received. Printer will carry out the command immediately once received

·This command is just available to the serial printer. The printer will carry out the command immediately under any state.

n = 1: Printer state

Bit	0/1	HEX	Decimal	Function
0	0	00	0	Fix as 0
1	1	02	2	Fix as 1
2	0	00	0	One or two cash boxes are opening
	1	04	4	Both of cash boxes are closed
3	0	00	0	Online
	1	08	8	Offline
4	1	10	16	Fix as 1
5,6				undefined
7	0	00	00	Fix as 0

n = 2: Off line state

Bit	0/1	HEX	Decimal	Function
0	0	00	0	Fix as 0
1	1	02	2	Fix as 1
2	0	00	0	Close the top cover, POS58Ⅳ fix as 0
	1	04	4	Open the top cover
3	0	00	0	Not holding down the feed button
	1	08	8	Holding down the feed button
4	1	10	16	Fix as 1
5	0	00	0	Printer is not lack of paper
	1	20	32	Printer is lack of paper
6	0	00	0	No error state
	1	40	64	Error state
7	0	00	0	Fix as 0

n = 3: Error state

Bit	0/1	HEX	Decimal	Function
0	0	00	0	Fix as 0
1	1	02	2	Fix as 1
2	-	-	-	Undefined
3	0	00	0	Noun cutter error POS58Ⅳ fix as 0
	1	08	8	Cutter error
4	1	10	16	Fix as 1
5	0	00	0	Noun unrecoverable error，fix as 0
	1	20	32	Have unrecoverable error
6	0	00	0	Printer head's temperature is normal
	1	40	64	Printer head's temperature is over range
7	0	00	0	Fix as 0

n = 4: Feeding paper state

Bit	1/0	HEX	Decimal	Function
0	0	00	0	Fix as 0
1	1	02	2	Fix as 1
2,3	0	00	0	Have paper pos58Ⅳ fix as 0
	1	0C	12	The paper is going out
4	1	10	16	Fix as 1
5,6	0	00	0	Have paper
	1	60	96	Noun paper
7	0	00	0	Fix as 0

Appendix 1 Performance Index

Printing method: Direct thermal

Printing width:57.5±0.5mm

Valid printing width:48mm

Printing density:8dots/mm,384dots/line

Printing speed:approx.70mm/sec or 20lines/s.

Reliability:

Printing head life:100 km

Using condition:

＊Print 12 × 24 ASCII characters, print 50 lines each time, intermittent print repeatedly

＊ Each dot-line printing at the same time should not exceed 25%,each character line
   and one dot vertical printing repeatedly should not exceed11 times

＊Use specified thermal paper

＊Thermal paper roll model : TF50KS－E（Japan Paper co .ltd）

AF50KS-E(JUJO THERMAL)

Thermal paper roll：   Width－－－57.5±0.5mm

Outer Diameter －－－50mm（max.）

Inner Diameter－－－13mm（min.）

Thickness－－－53～60g／m²

Printing Font：

12×24dots，1.25（W）×3.00（H）mm;

GB2312-80 (Chinese):

24×24dots，3.00（W）×3.00（H）mm.

·Serial interface:

DB25 socket (orifice), supports RTS/CTS protocol.

Baud rate : 1200～115200bps。

Datastructure:1start bit+8data bits+1stop bit. No parity.

·Parallel interface :

·DB25 or 36 socket (needle), 8bit parallel interface, BUSY/ACK handshaking
protocol ,TTL signal level.

Cash drawer control:DC12V，1A，6 pin RJ-11 socket 。

·Power Supply：

DC12V±10％，2A，A-1009-3P socket

Operation Environment:

SPRT

Operation temperature:5～50℃   Relative humidity:10～80％
Storage temperature:-20～60℃   Relative humidity:10～90℃

Appendix 2   Index of Printing Commands

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Appendix 3 Index of Printing Characters

十六进制	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
2		!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
3	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
6	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	
8	∈	ü	é	â	ä	à	å	ç	ê	ë	è	ï	î	ì	Ä	Å
9	É	Æ	FE	ô	ö	ò	û	ù	ÿ	Ö	Ü	¢	£	¥	₨	ƒ
A	á	í	ó	ú	ñ	Ñ	ª	º	¿	⌐	¬	½	¼	¡	《	》
B	░	▒	▓	│	┤	╡	╢	╖	╕	╣	║	╗	╝	╜	╛	┐
C	└	┴	┬	├	─	┼	╞	╟	╚	╔	╩	╦	╠	═	╬	╧
D	╨	╤	╥	╙	╘	╒	╓	╫	╪	┘	┌	█	▄	▌	▐	▀
E	α	β	Γ	π	Σ	σ	µ	τ	Φ	θ	Ω	δ	∞	φ	∈	∩
F	≡	±	≥	≤	⌠	⌡	÷	≈	°	•	−	√	ⁿ	²	■	